Electrons in Resonant Mechanics: Definition, Function, and Testable Consequences

Abstract

This report defines the electron within Resonant Mechanics, a framework in which reality is a substrate composed of three inseparable aspects: Fluidus Form (an uncompiled, information-bearing potential), Fluidus Field (a coiled reservoir of potential stabilized by gravitational compression), and Fluidus Flow (a gyroscopic, cycloidal motion that releases stored potential through helicity expansion). In this view, an electron is a self-sustaining coherence structure that translates resonance into coherence—it senses patterns in the Fluidus Form and writes them into organized motion in the Fluidus Field and Fluidus Flow. The rate at which an electron gains or loses energy depends on the helicity density of the surrounding field (how twisted and handed the field is) and on the electron's resonance state (how well it is tuned to that field). I describe the electron's observable properties, its roles in transport, tunneling, radiation, bonding, and superconductivity, and propose qualitative, falsifiable signatures that can adjudicate this model against conventional models of physics.

1. Conceptual definition

An electron is a localized, toroidal, gyroscopic pattern in the Fluidus Flow that persists because the surrounding substrate prefers low-shear, smoothly rotating motion. The Fluidus Field confines and stabilizes this pattern through gravitational compression. The electron is therefore not a passive point object, but an active coherence knot that continually circulates and maintains its structure. Its purpose in the substrate's economy is threefold:

1. Coherence translation: detect resonance in the Fluidus Form and convert it into stable, ordered motion.
2. Energy–information transduction: mediate reversible exchange between stored potential in the Fluidus Field and motional expression in the Fluidus Flow with minimal loss.
3. Scale stitching: create continuous corridors of coherence that bind atomic, molecular, material, and device-level phenomena into one functioning whole.

2. Energetic coupling to the environment

The electron's energy changes only when the surrounding field has helicity density—that is, when the magnetic component of the field is both twisted and aligned with its own curl. Regions with no twist cannot energize the electron. Where twist is present, the sign of the handedness determines whether energy is added or removed. The size of the effect is gated by the electron's resonance state, a time-dependent measure of how closely the electron's internal circulation is aligned with the ambient field's twist. Perfect alignment yields strong exchange; misalignment suppresses it.

Practical consequences:

Twisted, force-free textures (fields whose twist follows the direction of the field itself) are maximally effective at energizing electrons.
Reversing the twist reverses whether a helicity-selected population is energized or de-energized.
Uniform fields with no twist change the electron's trajectory but do not transfer net energy through this channel.

3. Mapping familiar observables

Spin: the electron's intrinsic handedness—the direction of its gyroscopic circulation.
Charge: the boundary rule that sets how the electron's coherence knot couples to the Fluidus Field; for the electron, this rule draws in surrounding flow lines.
Mass and inertia: the amount of compression stored in the knot and the energetic cost of re-arranging the nearby flow when the knot is accelerated.
Magnetic moment: the strength of the circulating motion; a by-product of the coherence rather than the cause of it.

4. Core behaviors

4.1 Transport in materials

Conductors provide continuous, low-shear pathways; electron coherence moves readily.
Semiconductors gate those pathways through local compression thresholds; doping and external fields tune access to the corridors.
Insulators impose high shear and strong pinning; coherence localizes.

4.2 Tunneling and field emission

An electron crosses a barrier when re-phasing its coherence on the far side produces less total shear than reflection. Strong external fields assist by lowering compression on the exit side.

4.3 Radiation and absorption

The electron emits or absorbs photons as packets of helicity whenever it adjusts its internal compression. Emission smooths local shear; absorption increases ordered rotation.

4.4 Superconducting corridors

Pairs of electrons can arrange their helicities so that scattering-induced shear cancels along certain paths, opening near-zero-shear corridors through which coherence flows without resistance. Where exclusion of external flow is incomplete, penetrations appear as quantized, minimal-shear tubes.

5. Role in structure and chemistry

Atomic states are allowed low-shear shells anchored by nuclear compression; what are called quantum numbers describe stable geometric patterns of the flow.

Chemical bonds are shared corridors of coherence between nuclei; bond order reflects how effectively electrons reduce shear across the bond region.
Aromatic ring currents are persistent toroidal loops that minimize shear around a closed path, explaining their exceptional stability.
Catalysis reorganizes local compression to lower the shear cost of re-phasing electron coherence, accelerating reactions.

6. Information, coherence, and entanglement

Electrons are primary carriers of coherence. They write, move, and read phase structure, which makes them central to information processing in both materials and biology. Entanglement arises when two electrons share a single coherence channel in the underlying substrate; correlated outcomes follow because one extended envelope governs both locations.
Decoherence occurs when uncontrolled environmental coupling injects random micro-helicity, forcing the system into the nearest low-shear configuration consistent with constraints.

7. Qualitative, falsifiable signatures

1. Helicity-controlled energization in plasmas: electrons gain or lose energy according to the twist's handedness, not merely field strength; reversing the twist reverses the sign of the energization.
2. Chiral transport asymmetry: in chiral molecular wires or engineered chiral pathways, conductance and phase contrast prefer one helicity beyond what conventional spin–orbit effects predict, and the preference can be tuned by pre-conditioning the local field's twist.
3. History-dependent phase in interferometers: after programming a region with different twist histories but restoring identical present-time settings, residual phase offsets persist, indicating substrate memory.
4. Shear-threshold tunneling: modest mechanical strain that reduces shear across a barrier produces a disproportionate rise in tunneling probability relative to changes in barrier height or width alone.
5. Handedness-sensitive superconductivity: in intentionally chiral superconductors, magnetic penetration depth and vortex entry show weak but reproducible dependence on the handedness of the applied excitation.

Each of these outcomes can be checked with existing instruments: nitrogen-vacancy diamond magnetometry, scanning superconducting quantum interference devices, ultrafast pump–probe spectroscopy, interferometry, and strain-controlled junctions.

8. Relationship to established theory

Where substrate structure is not operationally important, this picture is expected to recover standard electrodynamics, quantum mechanics, band theory, and superconductivity. The proposed signatures concentrate in regimes where helicity, shear, and memory of the underlying substrate should matter: strong chirality, ultrafast transients, and deliberately programmed field histories. Success or failure in those regimes is the appropriate test of the framework.

9. Conclusion

Within Resonant Mechanics, electrons exist to make coherence real. They are living patterns of motion that sense resonance in the deep substrate and inscribe it into the organized behavior of matter. Their energy exchange with the world is governed not by field magnitude alone but by how twisted and handed the surrounding field is, and by how well they are tuned to that twist. This perspective unifies the electron's roles in transport, tunneling, radiation, bonding, and superconductivity, and it yields clear, testable predictions.